granular material under the RCB for a leveling course. This fine granular material shall not be paid for separately but shall be incidental to the bid item “Precast RCB Culvert.”

The joints should fit as tightly as possible, with a maximum of 1 inch between barrel sections.

The four outside surfaces of each barrel section joint shall be wrapped with a geotextile fabric that prevents soil from leaking through the joint. The geotextile fabric shall be a minimum of 24 inches wide and shall meet the requirements of Geotextile Separation Fabric of section 709 of the ”North Dakota Supplemental Specifications.” Geotextile fabric shall also be required at the outside face of each cutoff wall vertical joint, if more than one unit is used.

The costs of providing and installing the strands and the geotextile fabric to wrap the barrel shall be incidental to the precast RCB.

606.05 METHOD OF MEASUREMENT.

Precast reinforced concrete box culverts will be measured by the linear foot complete and in place.

Precast reinforced concrete box culvert end sections will be measured by the unit complete and in place.

All hardware embedded in the reinforced concrete box culverts and end sections, all prestressing strands, hardware, bolts, and steel plates used to fasten the barrel sections and end sections together shall be incidental to the item “Precast Reinforced Concrete Box Culvert” and the item “Precast Reinforced Concrete Box Culvert End Section.”

606.06 BASIS OF PAYMENT.

Payment will be made at the contract unit price as follows:

Pay Item	**Pay Unit**
Single _____ x _____ Precast RCB culvert	Linear foot
Double _____ x _____ Precast RCB culvert	Linear foot
Single _____ x _____ Precast RCB culvert end section	Each
Double _____ x _____ Precast RCB culvert end section	Each

SECTION 612
REINFORCING STEEL

612.01 DESCRIPTION.

This work consists of furnishing and placing reinforcing steel.

612.02 MATERIALS.

Reinforcing steel shall meet Section 836 and furnished in the full lengths specified.

612.03 CONSTRUCTION REQUIREMENTS.

A. **Bar List.** The bar list and bending schedule in the Plans are for estimating quantities. The Contractor shall verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any errors. Errors in the bar list and bending schedule shall not be cause for adjustment of the Contract Unit Price.

B. **Protection of Materials.** Reinforcing steel shall be protected from damage and be free from dirt, detrimental scale or rust, paint, oil, and other foreign substance when incorporated into the work. The reinforcing steel shall be stored above the ground surface on platforms, skids, or other supports.

C. **Bending.** All reinforcing bars shall be bent cold according to A.C.I. 318. Bars partially embedded in concrete shall not be field bent unless specified.

D. **Placing and Fastening.** All reinforcing steel shall be accurately placed and firmly held in position by supports and fasteners and will be inspected and approved before concrete placement. Bars shall be tied at all intersections except where the spacing is less than 12 inches in any direction, in which case only alternate intersections need to be tied. Welding, flame cutting, or heating of bars will not be permitted.

   The top layer of transverse deck slab reinforcing steel shall be tied to the shear connectors at each girder line at a maximum longitudinal spacing of 6 feet. If shear connectors are not installed, ties shall be made to the deck forms at a maximum longitudinal and transverse spacing of 6 feet. Two wraps with 14-gauge non-corrosive ties shall be used for these ties.

   Bar supports shall be made of mortar, plastic, or metal. Metal bar supports that rest on the forms shall have corrosion-proof legs. Maximum spacing of slab bolsters and bar supports for deck slabs shall be 4 feet.

   Bundled bars shall be tied at intervals not to exceed 6-foot centers.

   The clear distance to the top of the deck reinforcing steel shall be checked and adjusted for clearance according to Section 602.03 B.2.

   Changes to the location or number of reinforcing bar splices will not be permitted.

E. **Epoxy-Coated Reinforcing Steel.** All equipment used to handle epoxy coated reinforcing bars shall be padded wherever the equipment is in contact with the bars. Bundled bars shall be lifted with multiple supports, or a platform bridge to prevent abrasion in the bundle. Bundles shall be transported carefully and never dropped or dragged. Bundles shall be stored on padded or wooden supports. If the bars are exposed to ultraviolet rays when storage on the job site or storage yard exceeds, or is expected to exceed, 60 calendar days, the bars shall be covered with opaque polyethylene or other suitable protective material. Provisions shall be made for adequate ventilation to prevent condensation under the covering.

Damaged epoxy coating shall be repaired before concrete is placed. Repairs shall be made using material and procedures recommended by the manufacturer. All visible signs of oxidation and rust shall be removed completely before repairs are made. When the extent of damaged coating exceeds 2% of the surface area of the coated reinforcing bar in any 1-foot length, the bar shall be rejected. When the extent of damage does not exceed 2% of the surface area in any 1-foot length, the bar may be used providing all damage discernible to a person with normal or corrected vision is repaired with patching material. The area covered by patching material, excluding patched cut ends, shall not exceed 5% of the surface area of the coated reinforcing bar.

Plastic, plastic-coated, or epoxy-coated bar supports shall be used to support epoxy-coated reinforcing bars. The wire tieing for epoxy-coated reinforcing bar shall be plastic coated.

612.04 METHOD OF MEASUREMENT.

Reinforcing Steel will be measured by the Lump Sum or by the Pound in place as specified or placed as ordered by the Engineer. Quantities of materials will be based upon the calculated weights of the Reinforcing Steel. The weights for steel bar reinforcement calculated will be based upon the following table:

Size	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
Wt. per Linear foot in pounds	0.376	0.668	1.043	1.502	2.044	2.670

Size	No. 9	No. 10	No. 11	No. 14	No. 18
Wt. per Linear foot in pounds	3.400	4.303	5.313	7.65	13.60

Supports, separators, ties, and other devices used for holding the reinforcement in place will be considered incidental to the item of Reinforcing Steel.

612.05 BASIS OF PAYMENT.

Payment will be made at the Contract Unit Price as follows:

Pay Item	**Pay Unit**
Reinforcing Steel	Pound, Lump Sum
Reinforcing Steel (Epoxy Coated)	Pound, Lump Sum

This payment will be full compensation for all labor, equipment, and materials necessary to complete the work.